

# Exploration and Identification of Amorphophallus spp in South Sulawesi

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## Exploration and Identification of *Amorphophallus* spp in South Sulawesi

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### ABSTRACT

To support the development of *Amorphophallus* as potential economic commodity especially in South Sulawesi, the first step that can be taken is to inventory the species found in this region. In this study we explore and identify *Amorphophallus* species found in South Sulawesi. The area of exploration was choose based on the information collected from media and personal interview about the plant with student that came from across the South Sulawesi Province. Exploration was conducted by driving a car and hiking through provincial and district oth habitat for *Amorphophallus* according to literature. We also gather information by showing pictures on the plant to the resident or farmers around the exploration site. We then collected the plant that found in the exploration, and identified each of them by morphological characters. This research found three species *Amorphophallus*, namely *A. paeonifolius*, *A. variabilis*, and *A. muelleri* spread across the South Sulawesi Regency, in 11 spot location at eight district: Takalar, Jeneponto, Bantaeng, Gowa, Maros, Bone, Soppeng, and East Luwu. The habitat were the plant grow naturally are under tree canopy, or other shade, which indicate the potential of this plant to growth under agroforestry system.

**Keywords:** *Amorphophallus variabilis*; *Amorphophallus paeonifolius*; *Amorphophallus muelleri*; South Sulawesi; exploration.

### 1. Introduction

*Amorphophallus* spp is a bush plant (herb) of the Araceae family with roots in the soil and on the particular species also has a bulbil on the ground. These plants grow in the forest or in the shade trees as the sun shines only require 50-60% so it is suitable for use in agroforestry systems. Tuber and bulbil stem can be harvested for use as a source of carbohydrates and glukomannan. This family of plant consists of hundred of species (Supriati, 2016), and each of them have a special character and benefit.

*Amorphophallus* has a high economic value in the world, because it has many benefits. Glukomannan extracted from the tubers of one plant species is used as an alternative to agar-agar and gelatin. Glukomannan is one form of the polysaccharide mannose and glucose are used as health food for weight loss and cholesterol. Other uses which can be used for paper adhesives, paint and polish cloth materials such as cotton / wool, as well

as the imitation of materials whose quality is better and cheaper than starch (Ganjari, 2014). Moreover, it can also be used as material for negative film, tape and celluloid because of its nature as cellulose. *Amorphophallus* has a high potential both for food diversification (Rokhmah and Supriadi, 2015), and raw material for medicine and cosmetics (Supriati, 2016).

Unfortunately in Indonesia the cultivation of *Amorphophallus* were very limited in some areas in Java Islands. On the other hand, these plants naturally grow wild in various regions of the country, including in South Sulawesi. In some areas of South Sulawesi *Amorphophallus* wild plant that is regarded as a weed, people did not know the benefits of *Amorphophallus*. To support the development of *Amorphophallus* as potential economic commodity especially in South Sulawesi, the first step that can be taken is to inventory the species found in this region. In this study we explore and identify *Amorphophallus* species found in South Sulawesi.

## 2. Methode

The area of exploration was choose based on the information collected from media and personal interview about the plant with student that came from across the South Sulawesi Province. Exploration was conducted by driving a car and hicking through provincial and district oth habitat for *Amorphophallus* according to literature. The same methode was used by Sjahril et al (2015) on exploration of wild rice species. We also gather information by showing pictures on the plant to the resident or farmers around the exploration site. We then collected the plant that found in the exploration, and identified each of them by morphological characters.

## 3. Results and discussion

Early identification shows that the region of South Sulawesi there are at least three species of *Amorphophallus*, namely *A. muelleri*, *A. variabilis*, and *A. Paeoniifolius* (Tabel 1). The *Amorphophallus* species was found in eight district accros the South Sulawesi region, were the climate condition was various from one to another. The wide spread of these species and their habitats in South Sulawesi are shown in Table 1. *A. variabilis* and *A. paeonifolius*, both were the varieties that have wide distribution in the province. *A. variabilis* was found in Takalar, Jenepono, Bantaeng, Gowa, Soppeng, and

East Luwu District. This study found *A. paeonifolius* distribute at Takalar, Jenepono, Bantaeng, Maros, Bone, Soppeng, and East Luwu District. *A. muelleri* has the narrowest distribution, this species only found in a hills at Maros Districts. This study showed that the three species grow naturally, and indicated the possibility to cultivated the species.

**Table 1.** Distribution and habitat of three species of *Amorphophallus* in South Sulawesi

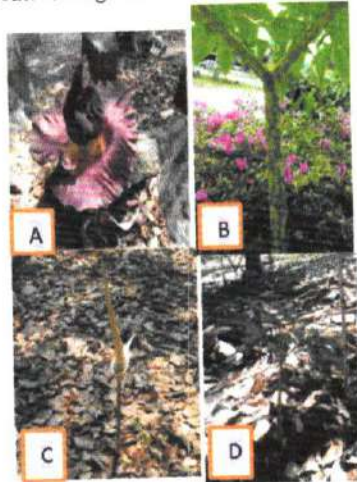
No	Areal	Sub district	District	Habitat	Species
1	Jipang	Bontonompo Selatan	Takalar	Rice fields	AV, AP
2	Palantikang	Bangkala	Jenepono	Under the trees	AV, AP
3	Pallantikang	Pallantikang	Bantaeng	Grave yard	AV, AP
4	Somba Opu	Bonto Laja	Gowa	Garbage dump	AV
5	Karaengta	Cendrana	Maros	Hills	AM
6	Patangkae	Cendrana	Maros	Hills	AP
7	Ujung	Lappariaja	Bone	Kakao Garden	AP
8	Lamuru	Marioriawa	Soppeng	Under the trees	AP
9	Medde	Marioriawa	Soppeng	House yard	AV, AP
10	Madiming	Marioriwawo	Soppeng	House yard	AV, AP
11	Takalalla	Malili	East Luwu	Grave yard	AP

Description: AV: *Amorphophallus variabilis*, AP: *A. paeonifolius*, and AM: *A. muelleri*

The three *Amorphophallus* species was known by the local farmers or resident as weeds, their existence was neglected because farmers did not know, that the plant have advantage. The plants generally found growth under trees or shade. Santosa *et al* (2004) stated that this plant growth optimum under shade 50-60%, naturally the plant found under the canopy of the forest vegetation. The vegetative stage of this plant were easily to recognize because the plant have some special character, for example they have white spot on the stem layer. The plant that we had found in this exploration has the same common characters as reported by Sumarwoto (2005) were the stems grow upright, soft, smooth green with white patches growing on yams in the soil. The stem is actually a single and pseudo-stem, 5-50 mm in diameter depending on the age / period of plant growth, breaking into three secondary stems and then breaking down into leaf stalks. *Amorphophallus* spp leaves include compound leaves and are divided into several leaf strings (fingers), light green to dark green. The child leaves an elliptical leaf with a pointed leaf tip, smooth wavy leaf surface. Leaf edge color varies from light purple (on young leaves), green (on medium aged leaves), and yellow (on old leaves). In normal

growth. each plant stem has 4 compound leaves and each compound there are about 10 leaves. The width of the leaf canopy can reach 25-150 cm, depending on the age of the plant.

In the generative stage *A. paeonifolius* was easily misunderstood by the people as *Rafflesia arnoldi*, because both have almost the same characters were the flowers looks like came out from the ground and have the same bad odor that smell like a dead body. The vegetative and generative stage of the three species can be seen in figure 1.



**Figure 1.** A. Generative stage of *A. paeonifolius*. B. Vegetative stage of *A. paeonifolius*. C. Generative stage of *A. variabilis*. D. Vegetative stage of *A. variabilis*.

In this exploration *A. muelleri* has the narrowest distribution. This species only found in Maros District, at the limestones hills. It's suspected that the species needed special condition to growth and suitable with soil condition at the limestones hills. *A. muelleri* was recognized by the vegetative bulb called "bulbil" that growth on the leaves node. The "bulbil" shown in Figure 2.



**Figure 2.** Bulbil of *A. muelleri* pointed by the red arrow

According to Sumarwoto (2005) bulbil are grown at the meeting points of secondary stems and armpits of leaves, and will grow symmetrical round nodules, with 10-45 mm in diameter. This tubers can be used as seeds. The size of the bulbil depends on the age of the plant. The outside of the bulbil is brownish yellow while the inside is yellow to brownish yellow. The existence of the bulbil distinguishes *A. muelleri* plants from other types of *Amorphophallus*. The amount of bulbil depends on leaf branching segments, usually in the range of 4-15 bulbil per tree.

The natural habitat where the plant was found are under the shade of trees or other canopy that limited the light, this indicated the potential of this plant to cultivated in agroforestry system. One example of successful development of *Amorphophallus* in agroforestry in supporting the conservation of forest resources can be seen in the village of Klangan, East Java. Farmers in this village has managed to cultivate and enjoy the *Amorphophallus* on state forest land in cooperation with the Perhutani. (Sulaeman, 2004). Ownership *Amorphophallus* encourage farmers to a sense of ownership of forest stands, which in turn created the forest security. *Amorphophallus* since become the foundation of the economy, the forest area has decreased Saradan RPH Perhutani land degradation is only about 3% per year (10.1 acres) compared with other forest degradation up to 19% per year (RPH Pajajaran), and 78% per year (RPH Jenangan) (Sulaeman, 2007).

#### 4. Conclusion

This research found three species *Amorphophallus*, namely *A. paeonifolius*, *A. variabilis*, and *A. muelleri* spread across the South Sulawesi Regency, in 11 spot location at eight district: Takalar, Jenepono, Bantaeng, Gowa, Maros, Bone, Soppeng, and East Luwu. The habitat were the plant grow naturally are under tree canopy, or other shade, which indicate the potensial of this plant to growth under agroforestry system.

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